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John S Pratt Kilpatrick Stockton Suite 2800 1100 Peachtree Street Atlanta, GA 30309-4530			EXAMINER PADGETT, MARIANNE L	
			ART UNIT 1762	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/018,727	<b>Applicant(s)</b> WILLIS ET AL.	
	<b>Examiner</b> Marianne L. Padgett	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7, 8 and 12-21 is/are pending in the application.
- 4a) Of the above claim(s) 8 and 13-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 12, 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☒ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/27/2007 has been entered.

Applicants have amended the independent claim 1, so as to address some concern set forth by the examiner in the 12/6/2006 advisory action (second paragraph of section 11 thereof), such that the claims now clearly set forth that the claimed process produces polymer growth on the surface, although the claim language in the body of the claim does not explicitly connect the "polymer growth..." (claim 1, line 13) to "a reactive to proxy containing coating" (claim 1, lines 1-2) in the preamble, i.e. while the relationship may be inferred, it is not necessitated. It is noted that while this provides further context to the intent of the claims, the requirement for polymer growth does not significantly affect the art rejections, as all art applied therein caused plasma polymerization to create a coating from monomers, that may include epoxies.

The examiner notes that as discussed in section 6 of the action mailed 1/12/2005, there is still no copy in the scanned file of the foreign priority document UK 0001514.9 dated 1/25/2000.

2. Claims 1-4, 7, 12 & 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In independent claim 1, the preamble is not commensurate in scope with the body of the claim, as the preamble requires the application of "a reactive epoxy containing coating", while the body of the claim has a different set of requirements, which require starting reagents to contain epoxies that are polymerizable monomers given by formulas I or IA, which are implied to cause polymer growth to occur on the surface, but while epoxies are present in the reagents, there is no **necessity** that the resultant

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polymer growth **contains reactive epoxy functionalities**. It is noted that while the parameters for the pulsed plasma that are now included in the independent claim may be considered to suggest in light of discussion in the specification that epoxy functionalities remain, but such a result is not actually necessitated, because all parameters of the plasma which can affect the results are not defined. For example, whether or not reactive epoxy groups remain in the resultant polymer can be significantly affected by the substrate or reaction temperature, which as claimed is unlimited, hence specifying the average power density & the power off time of the pulsed plasma does not necessitate that any reactive epoxy groups necessarily remain for the plasma polymerization steps as set forth in claim 1. It is noted that none of the dependent claims correct this deficiency, although claim 12 refers to "a reactive epoxy containing coating... according to claim 1", it only has possible antecedence in the preamble (not necessary antecedents, as the article employed is "a"), not the body of claim 1.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4, 7, 12 & 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Connell et al (UK 1,037,144), in view of Timmons et al (5,876,753) or visa versa, previously

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discussed in sections 9-10, 5, 3 & 3 of the actions mailed 1/12/2005, 9/28/2005, 3/21/2006 & 8/28/2006, respectively (updated & condensed below for clarity & convenience).

In Connell et al, see Fig. 1, p. 2, lines 26-53 & 87-128+ for plasma apparatus and parameters used in the plasma polymerization process, and see p. 2, lines 66-72 for a variety of monomers that includes epoxies, such as glycidyl methacrylate (line 70), which according to the PCT examination & applicants' specification (page 5, lines 6-8, which gives this compound as an example of applicants' formula III) reads on the monomer used in these claims. From the structure of glycidyl acrylate (p. 569 of Hawley's Cond. Chem. Dictionary, 12<sup>th</sup> ed), it is clear that the analogous methacrylate compound corresponds to applicant's formula (I), where  $R_1 = \text{CH}_3\text{CH}=\text{CH}$ ;  $Y = \text{O}$ ;  $R^2 = -\text{CH}_2-$ , thus confirming the PCT evaluation.

While Connell et al teach plasma polymerization of claimed monomers, they do not discuss use of pulsed plasma and parameters associated therewith, nor we act a potentially result in epoxy functionalized coated surface with a nucleophile, such as an amine or carboxylic acid as independent claims 12 & 21.

Timmons et al teach plasma polymerization of monomers using continuous or pulsed plasma, where use of low energy plasma, as exemplified by a pulsed plasma of 200 W and on-off duty cycles of 3/5, 3/15, 3/45 and 3/60 ms, which are lower values thing can be calculated from the present claims ON/OFF times of claims 7 (i.e. 2/1000 & 1/1000 as possible maximums & minimums). Use of such low energies is taught to enable the deposited polymer to retain active functional groups that can be employed in a derivation reaction to covalently couple to these groups, which are taught to include various O-containing functionalizations, including epoxy (table on col. 9). The derivatization is said to be a variety of nucleophilic displacement, which may use various amino containing materials that are a subset of the claimed amines. See the abstract; col. 3, lines 45-col. 4, line 38, esp. col. 3, lines 50-55 & 62-col. 4, lines 5, 24 & 30-38; col. 6, lines 15-col. 7, line 45+; col. 8, line 1-6; col. 9, lines 1-32. It would have been

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further obvious to one of ordinary skill in the art when employing the pulsed plasma process to determine desirable ranges of pulsed plasma parameters for the polymerization reaction via routine experimentation to provide an effectively low power plasma as taught by Timmons et al, especially given their teaching on col. 7-8, that different reaction chambers provide additional variables for determining parameters, and employing taught power, on/off relationships as a guide to power (hence power density) and cycle time determination. It is noted that besides not actually disclosing the any explicit duty cycle ranges, applicants' specification does not provide any particular significance to either the specific examples or general ranges of ON/OFF time from which some possible duty cycles may be calculated, nor to duty cycle in general, considering determination of "pulsing arrangements" to be "routine" (page 6, lines 17-18), hence no unexpected or critical results is seen to be taught in association with these claimed values, & the general concept is covered by Timmons et al.

While Timmons et al include epoxy-containing monomers in their teachings, exemplified by allyl glycidylether; they do not disclosure compounds of applicants' particularly claimed epoxy formulas. Also the particular energy density and on-off time parameter are not explicitly taught.

It would have been obvious to one of ordinary skill in the art to employ the pulsed plasma process in the deposition of Connell et al or the monomer, glycidyl methacrylate, in the process of Timmons et al, because in the first case, Timmons teaches the equivalent usage of continuous or pulsed for plasma deposition (abstract), but further provides advantages in energy control due to use of pulsed plasma, that enables further use of the deposits for the claimed process of in mobilizing a nucleophilic reagent without further modification, thus suggesting the desirability of pulsed plasmas & motivating their use instead of continuous plasmas. Use of Connell et al's monomer in Timmons et al's process, would have been obvious, as it is consistent with the generic categories of useful compounds taught, capable of providing desired functional groups for the subsequent derivatization/mobilization reaction, and has been shown to be effectively deposited via plasma polymerization, which is the process employed by Timmons et al.

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It would have been further obvious to one ordinary skill to determine desirable ranges of pulsed plasma parameters for the polymerization reaction for specific monomers via routine experimentation to provide an effective low power plasma as taught by Timmons et al, especially given their teaching on col. 7-8, that different reaction chambers provide additional variables for determining parameters, and employing taught power, on/off relationships as a guide to power usage (hence power density) and cycle time determination. Note while Timmons et al provides some exemplary powers, they do not give power density, which can not be specifically determined or explicitly compared, if plasma volume is not known, but energy density is related to the above routine experimentation to determine parameters, hence would have been expected to be considered.

Applicants have amended the independent claim 1 to require "an average power density of the pulsed plasma discharge is less than  $0.0025 \text{ W/cm}^3$ ", which narrowed from less than  $0.05 \text{ W/cm}^3$ ", previously discussed, but is still germane to the routine experimentation arguments. The argument set forth in the last 3 actions (3/21/06, 8/28/06 & advisory 12/6/06) remain applicable to the claims as amended (as units used/probable intent were considered more seriously than the misnomer with respect power). Hence, it remains as previously noted that while the applied references do not provide values of power density *per se*, Timmons et al. was previously noted to provide **teachings on routine experimentation to provide an effective low power plasma** in col. 7-8. Particularly see therein lines 28-45 in col. 7, which discuss how the volume of the reactor chamber affects power density in plasmas of like power, stating "large reaction volume at a given applied power would also provide increase retention of monomer functional groups, as this variation in effect decreases the power density during plasma polymerization processes", thus from the teachings of Timmons et al., it is considered that it would have remained clear to one of ordinary skill in the art to employ routine experimentation to adjust one's power density for the particular reagents employed, so as to provide desired retention of monomer functional groups as taught, which from the teachings of Timmons to effect low-power plasmas, that take into

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consideration volume, would have been expected to include optimization to relatively low powers, such as those within power densities claimed. Narrowing the claimed power density range is not considered to provide a significant differentiation from teachings of routine experimentation for essentially optimization purposes, especially considering that applicants' specification provides no determinable actual evidence or data for the superiority of the presently claimed average power density range as combined with time or ON/OFF times over any other average power density range or cycle times used in another pulsed plasma.

Applicants have previously alleged (bottom p.7, 12/30/2005 remarks) that Timmons et al. teach away from "low pulsed plasma discharge", however this "low" had no clear meaning & their following discussion concerning pulsed low duty cycles was & remains irrelevant to most the claims, as the unsupported duty cycle ranges have been deleted from the claims. Applicants' previous discussion (top p.8, 12/30/2005 remarks) of depositions using "pulses of extremely low mean power (0.04 W)" with reference to examples 4 & 5 on page 9, was noted to be inconsistent with the specification's examples, as none of the examples on p. 9 -10, i.e. examples 1-9, have any teachings of "mean power", as they all provide only a "peak power = 40W", which even given the ON and OFF times of the plasma, does not provide sufficient information to calculate an arithmetic mean power, as peak power is the highest value reached providing no other information on instantaneous power values during the ON period, nor would such a value have any relevant meaning with respect to the present claim limitations, which relate to power density, thus require one to know the plasma volume. The examiner noted that  $< 0.05 \text{ W/cc}$  & the preferred range of less than symbol  $0.0025 \text{ W/cc}$  was introduced on page 6, lines 10-12, where the "average power of the pulsed plasma discharge" would in context more properly read --average power density...--, however the context of the specification would imply that this is the average power over the duration of the pulses only, because that's when the discharge is taking place, but discussion concerning duty cycle, which is only relevant to claim 7, suggest averaging over both the pulses ON-time and OFF-time. As the examiner noted, no teachings of plasma volume for the particular taught ranges of (20  $\mu\text{s}$



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ON)/(10,000- 20,000  $\mu$ s OFF), she sees no way to relate the claimed plasma power density values to the exemplary 40 W peak power used with the exemplary ON/OFF times (20  $\mu$ s/20 ms), hence the examples are not commensurate in scope with the claim limitations. Is it possible that a declaration/affidavit could be presented that provided more complete information on the examples in the specification, such that a clear relationship could be determined between the claimed power density & the information of the specific examples? Note, it would still be necessary for the claims to be commensurate in scope with any evidence said to show a patently significant difference.

With respect to specification teachings relating to criticality of the pulsed plasma parameter of power density (i.e.  $< (0.05 \text{ or } 0.0025) \text{ W/cc}$ ), however the only place it was found to be mentioned was on page 6, lines 10-12, where it was never particularly related specifically to any of the individual compounds, nor more than generally to the on-off times (i.e. duty cycle). None of the examples disclose what power densities were used to produce their results, only providing teachings comparing continuous wave plasma and pulsed plasma, where the pulsed plasma used specific parameters of a peak power of 40 W, with 20  $\mu$ s ON time/20 ms OFF time, which as discussed above provides no determinable significance to the power density in the independent claim 1. While the compositional data on the deposits comparing continuous plasma and pulsed pulsed, show significant differences therebetween, those differences are consistent with the teachings of Timmons et al., who notes that as compared to continuous plasmas, pulsed plasmas are expected to increase retention of functional groups, such that one would have expected that an increased percentage of heteroatoms a functional groups, such as oxygen, to remain. Thus lacking a showing that this particular range of **power densities** has a **significantly** different effect in the deposition of the claimed compounds as compared to higher power densities also for pulsed plasmas (i.e. not just the expected trends & affects suggested by the teachings of Timmons et al.), or that claimed compounds as compared to other epoxy monomers are significantly differently affected (examples 1 & 4 of the specification hint at that for GMA & AGE, but are not commensurate in scope with the claims (see

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above)), the examiner finds no patentable significance in this particular narrower range for the claims as written, as it appears to be consistent with routine experimentation to optimize pulsed plasma parameters, and expected taught trends associated with pulsed low-power plasmas.

5. As stated in section 6 of the 9/28/2005 action, it remains noted that FR 2,581,991 to Delfort et al cited by PCT, continues to provide cumulative evidence that the amine groups provided to the active epoxy functional groups on the coated surface, would have been expected to proceed in a covalent coupling reaction or derivatization at the site of the epoxy as suggested and claimed, as well as providing further evidence of the known desirability of such reaction products.

6. Claims 1-4, 7, 12 & 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Timmons et al (753, discussed above in section 4), in view of Kolluri et al (5,723,219), previously discussed in sections (10 & 12-13), (3 & 5) & 5 of the actions mailed 1/12/05, 3/21/2006 & 8/28/2006, respectively, and reiterated below.

As noted above Timmons et al teach allyl glycidyl ether (AGE) as an exemplary epoxy-containing monomer, instead of the claimed epoxy compounds represented by claimed formulas I & IA or their more specific formulas II or III, but Kolluri et al also teach analogous plasma polymerization reactions, where either AGE or GMA are taught to be deposited for their reactive epoxy functional groups, hence use of GPA in Timmons et al would have been expected to be effective for the taught process due to taught equivalence, providing an alternative species for the generically taught epoxy containing monomers. Above discussions of routine experimentation are equally applicable in this combination, as previously noted.

In Kolluri et al., see the abstract; col. 2, lines 35-57+ for prior art plasma polymerization and its limits; col. 3, lines 5-26 for background discussion of pulsed plasma polymerization to preserve functional groups in deposited films; summary for sequential plasma depositions; col. 5, lines 40-49 for classes of monomer including epoxies, with lines 47-48 teaches allyl glycidyl ether, glycidyl methacrylate

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(GMA), etc; col. 6, lines 5-30 teaching various amines & lines 60-67 plasma in general; col. 7, table I gives surface functional groups where the functional group remaining on the surface for 1<sup>st</sup> plasma deposited layer is in the first column of table I, and what it reacts with in the 2nd column & what's produced in the last column, where #13 and 14 give specific examples that react amines functional groups with epoxy functional groups on the surface; col. 8, line 62-col. 9, line 14, esp. 3 and 10-11 with such suggested combinations; col. 9, 15+ with specific examples noting plasma may be pulsed (col. 9, line 50; col. 10 line 52; col. 12, line 56-57, etc); col. 16, line 30-60; & col. 20, line 18-col. 21, line 23 discussing and illustrating first plasma deposition using GMA, then plasma depositing an amine thereon via reaction with the epoxy group; and claims 1, 4-6, etc.

7. Applicant's arguments filed 2/27/2007, and discussed above have been fully considered but they are not persuasive.

It applicants' remarks of 2/27/2007, in the third paragraph on page 6, applicants essentially state that none of the references teach the specifically claimed range, a point which has long been acknowledged by the rejections for broader ranges than this narrow one that encompasses the previous claimed range, however as discussed above it is not necessary for reference to provide teachings directed to specific parameters, if they would have been obvious to determine by routine experimentation. Merely not teaching specific parameters does not negate their obviousness.

On page 7 of their response, applicants assert that one of ordinary skill would not make the combination, because the chemistry of the monomers of Timmons is different from that disclosed by Connell et al. or Kolluri et al., but failed to be convincing concerning how epoxy groups, including epoxy groups of overlapping compounds provide different chemistry (Connell et al. (p.2, lines 70-71) or Kolluri et al. (col. 5, lines 46-48)), i.e. how does the identical epoxy functional group and/or monomer therewith have different chemistry from the identical epoxy functional group, especially when all three references discussed plasma polymerization with respect to allyl glycidyl ether (AGE), with Cornell et al. or Kolluri

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et al. listing GMA & AGE sequentially as alternatives for plasma polymerization? In Timmons et al., col. 8, lines 51-col. 9, lines 32, specifically note that "low-power plasma polymerization processes, particularly pulsed plasmas, can be utilized to provide surface films having an enormous range of reacted functional groups...", where the partial list of useful monomers that may supply intact functional groups includes allyl glycidyl ether, whose functional group intended to be deposited intact via plasma is epoxy, and which compound is taught alternatively with the claimed compound GMA in Connell et al. or Kolluri et al., hence can hardly be said to be directed to nonanalogous chemistry, especially considering that Kolluri et al. also acknowledges the effects of pulsed plasma on functional group retention, as well as mentioning the possibility of using pulsed plasmas for plasma polymerization (col. 3, lines 5-30; col. 9, line 50-52; col. 10, lines 52-55; col. 12, lines 56-58; etc.), although not providing a 102 rejection by discussing use of the pulsed plasma with GMA specifically.

On page 7 of the response 2nd-3rd paragraphs plus, applicants discuss pulsed plasma affects on free radical initiate polymerization, particular directed to monomers containing acrylate or methacrylate, however applicants have not pointed out such teachings on free radical polymerization in the specification, nor are the claims limited to free radical polymerization, or to acrylates or methacrylates, as neither claimed formula I nor IA are required to be acrylates, only further defining formula I in claims 2-4 are positively related to acrylates, hence applicants' arguments contain unsupported allegations & are not commensurate in scope with the claim language, particularly for independent claim 1 & dependent claims 7, 12 & 21. The examiner notes applicants do have some comparison studies on page 16-18 of the specification directed to allyl glycidyl ether, but as discussed above lack determinable relationship to claimed power density parameters, and no discussion of free radical polymerization is found therein, nor do the claims necessarily differentiate from the type of results produced by pulsed plasma with such materials as polymerization occurs with either continuous or pulsed, as well as having observed indication of presence epoxy functional groups remaining (AGE plasma polymerization (continuous & pulsed))

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results discussion admit to some remaining epoxy groups), especially noting that the claims as written do not **positively** require the presence of epoxy groups remaining, nor any specific amount if one considers the preamble. Is it possible that a declaration/affidavit could be presented that provided more complete information on the examples in the specification, such that a clear relationship could be determined between the claimed power density & the information of the specific examples, and thus might show conclusive evidence of significant differences between types of epoxy monomers relating to claimed pulsed plasma parameters? Note, it would still be necessary for the claims to be commensurate in scope with any evidence said to show a patently significant difference, noting that claimed formula I A of an aromatic epoxy, cannot be considered sufficiently analogous to GMA for the GMA examples to provide evidence therefore.

On page 8 of their response, applicants cite a partial sentence from my reference by Moad et al., which reference is not of record nor supplied in the scan file, hence the examiner cannot evaluate whether the context of this abbreviated citation has significance relevance to the claims/arguments.

Applicants object to Kolluri et al. (page 9 response), because the epoxy group is only one example of various functional groups that may be plasma deposited, however suggesting alternative functional groups in no way negates the teachings of the usefulness or the effectiveness of plasma polymerization to achieve epoxy functionalized coatings.

8. Other art of interest includes Kokaku et al. (4,863,557: col. 3, lines 3-16 & col. 4, lines 4-22; & 4,560,641; col. 3, lines 39-68, especially 63-67 & col. 6 examples 5 & 6), who teach GMA & AGE or glycidyl vinyl ether as used equivalently for plasma polymerization deposition; and Taguchi et al. (2003/0124382 A1), who in [0039] terms glycidyl acrylate, GMA & AGE, as all being classed as epoxy-containing vinyl monomers, thus all showing expectations of analogous chemistry &/or analogous plasma polymerization reactions. Note that Kokaku et al. (557), while not teaching the necessity of having remaining epoxy functionalities, nor pulsed plasma, does indicate that for their 13.56 MHz H.F. plasma at

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monomer pressures of 0.01-5 Torr, that appropriate ranges of plasma density include 0.01-10 W/cm<sup>2</sup>. Similarly, Yokura et al. (JP 01-171856) reforms plasma polymerization, particularly of acrylic or methacrylic compounds having a glycidyl group, where the English abstract particularly exemplifies glycidyl methacrylate preformed at pressure = 0.12 Torr & a power density discharge of 400 Wmin/m<sup>2</sup>, which is equivalent to 0.04Wmin/cm<sup>2</sup>, thus it is noted that it is old and well-known in the art to employ relatively low power density is for plasma polymerization of GMA, even when there is no necessity in the teachings stating the desirability of maintaining the presence of the glycidyl (= epoxy groups) on the surface of the deposited layer, hence these references can be considered to provide evidence in support of or cumulative to the above discussed teachings of Timmons et al., as combined with the above rejections, as a person of ordinary skill in the art when employing the teachings of routine experimentation would have reasonably considered such known power densities as maximum starting points for routine experimentation for preserving epoxy groups on GMA, given teachings suggesting that retention of the epoxy groups require lower power. It would be a matter of competence for a person of ordinary skill to consider variation in plasma parameters of particular reagents based on known parameters for related plasma polymerizations in combination with Timmons teachings on how to preserve functional groups on plasma polymerized depositions.

9. Claims 1-4, 7, 12 & 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Timmons et al ((753), discussed above in section 4), in view of Chabreck et al. (WO 98/28026).

Chabreck et al. provide teachings concerning plasma polymerization mechanisms for unsaturated (i.e. vinyl groups, p.9) monomers carrying reactive groups, such as epoxies, where it is desired to retain the reactive groups or functionalities on the plasma polymerized coating, where the last paragraph on p.4 teaches that epoxy groups are particularly susceptible to plasma decomposition. Chabreck et al. teach that controlling & retaining the functional groups on deposits of the plasma

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polymerized unsaturated monomers with reactive groups, such as GMA (p.33, Ex.B-5), is effected by use of the afterglow of the plasma, which is mechanistically equivalent to the off-time in a pulsed plasma process. Additionally, when discussing useful plasma parameters, Chabreck et al. teach that the plasma is preferably "an inductively coupled, pulsed radio frequency glow discharge plasma" (page 11, especially last two lines). Chabreck et al. further teach that their primary plasma problem arise coatings with reactive groups, such as epoxies, may be further reacted, such as with solutions where the compositions have groups reacted with the retained reactive group of the polymerized coating, with examples C-14 & C-15 on page 38 employing the plasma polymerized coating of GMA to react with solutions of "4-amino-Tempo" or "Jaffamine ED2001", which appear to be tradenames for amine-containing compounds. In Chabreck et al., further see the abstract; 1st paragraph, p.1; p. 3-6, especially the paragraph bridging p. 5-6+ following paragraph; page 7, 3rd full paragraph, noting suggested -containing molecules for the top or secondary coating, such as methylamine; p.12, especially paragraph bridging with 13; paragraph bridging p. 16-17 through p. 19, especially top & metal paragraphs p.17).

Given the above teachings of Chabreck et al. on the need to protect functional groups like epoxies on monomers, such as GMA, from the decomposition effects of plasma in order to provide plasma polymerized epoxy functionalized coatings to be used for further reaction was secondary coatings that may contain amines, it would have been obvious to one of ordinary skill in the art to employ unsaturated epoxy containing monomers, such as GMA, in the pulsed plasma process of Timmons et al. as discussed above, as Chabreck et al. indicate that GMA requires protection from the decomposition effects of an *in situ* continuous plasma in order to provide plasma polymerized depositions that retained the epoxy functional group, while simultaneously indicating that pulsed plasmas that employ the afterglow from the plasma discharge will both enable such retention of epoxy functionalities in the deposited coating and effectively polymerized the GMA, hence the examiner takes notice that one of ordinary skill in the art would recognize the correspondence with the pulsed plasma teachings of

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Timmons et al., as well as the resultant coatings usefulness for reacting with secondary coatings, such as amines, and thus apply the above discussed teachings of routine experimentation in Timmons et al. to determine effective pulsed plasma parameters for GMA used in Timmons particular pulsed plasma polymerization deposition technique.

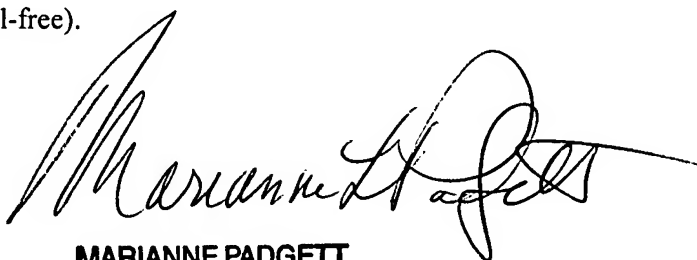
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

5/8-10/2007

A handwritten signature in black ink, appearing to read 'Marianne L. Padgett', with a stylized, flowing script.

**MARIANNE PADGETT  
PRIMARY EXAMINER**